Journal of Community Medicine & Public Health
ElToukhy RA, et al. J Community Med Public Health 7: 399
www.doi.org/10.29011/2577-2228.100399
www.gavinpublishers.com

OPEN ACCESS

GAVIN PUBLISHERS

Research Article

Post-COVID Clinical Manifestations in Non-Hospitalized Patients with COVID-19: A Retrospective Cohort Study

Riham A ElToukhy[1*], Saleh Fahad AlBahlei[1], Samir Ibrahim Arif[1], Khalid Hamad AlHarbi[1], Yazed Eid AlBalawi[1], Turki Adnan AlKamal[2], Salem Wadie Basamad[3], Nesrien Salih Makki[4], Marwa Ashraf Zahran[1]

[1]University Family Medicine Center, Department of Family and Community Medicine, College of Medicine, King Saud University Medical City, Riyadh 2925, Saudi Arabia

[2]Military Hospital, AlHada, Taif, Saudi Arabia

[3]Department of Orthopedic Surgery, King Faisal Specialist Hospital & Research Center, Riyadh, Saudi Arabia

[4]Caafi Health institution, Bristol, United Kingdom

[*]**Corresponding author:** Riham A ElToukhy, University Family Medicine Center, Department of Family and Community Medicine, College of Medicine, King Saud University Medical City, Riyadh 2925, Saudi Arabia

Citation: ElToukhy RA, AlBahlei SF, Arif SI, AlHarbi KH, AlBalawi YE, et al. (2024) Post-COVID Clinical Manifestations in Non-Hospitalized Patients with COVID-19: A Retrospective Cohort Study. J Community Med Public Health 8: 399. DOI: https://doi.org/10.29011/2577-2228.100399

Received Date: 22 December, 2023; **Accepted Date:** 08 January, 2024; **Published Date:** 11 January, 2024

Abstract

Background: Clinical features and outcomes of COVID-19 patients after discharge must be improved in specific populations. Therefore, we aim to investigate important parameters (clinical, laboratory, radiological, and outcomes) in the post-hospital discharge of COVID-19 infection. **Methods:** through retrospective study included COVID-19 hospital staff patients discharged between January and December 2020 from King Khalid University Hospital, King Saud University medical city, Riyadh Province, Saudi Arabia. **Conclusions:** Low-risk profile patients have similar persistent post-COVID symptoms during the first 30 days post-infection clearance or longer. This finding needs more dedicated parameter indicators and closed-duration monitoring.

Introduction

The infectious pandemic coronavirus disease 19 (COVID-19) death cases have exceeded four million individuals since its first discovery in December 2019 [1,2]. It is caused by Severe Acute Respiratory coronavirus 2 (SARS-CoV-2), and the need for intensive care management reached 32%, with significant in-hospital-related mortality [3-6]. The established body of evidence reported a range of disease severity from asymptomatic carriers to respiratory failure and Acute Respiratory Distress Syndrome (ARDS) [6,7]. Along with the primary infection site, "lungs," COVID-19 also causes multiple organ dysfunction. These organs, like the digestive, cardiovascular, neurological, and hematopoietic systems, have related or unrelated clinical and pathological manifestations [8-11]. The elderly, obese male with concurrent diabetes were the important risk factors for severe morbidity and mortality [12,13].

Early appropriate, targeted clinical examinations, laboratory tests, and imaging findings impact individual outcomes. These clinical parameters can be used as a guide to confirm the diagnosis, assess the prognosis, and develop the treatment strategy [14,15]. However, the clinical features and outcomes of COVID-19 patients after discharge must be improved in specific populations. Therefore, we aim to investigate important parameters (clinical, laboratory, radiological, and outcomes) in post-hospital discharge of COVID-19 infection.

Methods

Study population and Follow-up

This retrospective study included COVID-19 hospital staff patients discharged between January and December 2020 from King Khalid University Hospital, King Saud University medical city, Riyadh Province, Saudi Arabia. The diagnosis of COVID-19 followed the World Health Organization (WHO) guidance; patients tested positive for SARS-CoV-2 in throat swab samples by real-time polymerase chain reaction. We reported the clinical features of these COVID-19 patients at admission and during hospitalization [11]. Patients with persistent symptoms had a follow-up visit to the outpatient clinic for up to nine months post-primary infection. SARS-CoV-2 nucleic acids in throat swab samples, blood routine examination, biochemical examination, chest X-Ray, and chest CT (in some cases) were performed during that visit. Additionally, symptoms and signs of patients were also recorded.

Data collection and definition

Patient-related data during the first diagnosis and post-COVID clinic follow-up were extracted and recorded from the electronic medical record system. Dedicated physicians who collected this information were responsible for patients' follow-up post-COVID clinic. The follow-up data were recorded from one week to nine months after discharge based on the time of the clinic visit. The discharge standards after the first attack were proposed per WHO as follows: (1) the body temperature has returned to normal for more than three days; (2) respiratory symptoms have significantly improved; (3) lung inflammation has shown obvious signs of absorption; and (4) respiratory nucleic acid tests have been negative two consecutive times (at least 24 hours apart) [16]. In the study, we considered 30 days as a cutoff point between early and late presentation for the post-COVID clinic with either persistent symptomatology or seeking medical reassurance. The diagnosis of Acute Respiratory Distress Syndrome (ARDS) was based on the Berlin definition [15].

Statistical analysis

Continuous variables were expressed using mean (Standard Deviation [SD]) or median (interquartile [IQs]) based on the data distribution. Categorical variables were presented using frequency percentages. The groups were compared by chi-square tests or Fisher's exact tests for categorical variables and student's t-test for comparing continuous variables. Results were significant if p-value of 0.05 or less. All data were analyzed using STATA, version 14.0 (StataCorp LP, Texas, USA).

Results

Patients' Clinical Features on Admission

A total of 520 patients (age: mean 36.3 ± 9.4 and median 34 (30, 42), male 271 (52.12%), and female 249 (47.88%) were included. The overall prevalence of medical co-morbidities was less than 6%. There was 5.19% hypertensive, 5.38% diabetes, 3.46% dyslipidemia, 3.08% for both bronchial asthma and hypothyroidism, and both ischemic heart disease and depression were 0.19%. Over the median duration between the first positive swab and the post-COVID clinic visit of 25 (17, 44) days, only 45 (8.65%) patients had visited the post-COVID clinic for persistent symptomatology or medical reassurance (Table 1).

	Total 520	**Visiting Post COVID clinic 45 (8.65%)**
Age		
Mean and SD	36.3 ± 9.4	36.8 ± 11.2
Median and IQs	34 (30, 42)	33 (30, 41)
Sex		
Male	271 (52.12%)	24 (53.33%)
Female	249 (47.88%)	21 (46.67%)
Ethnicity		
Arab	323 (62.12%)	33 (73.33%)
Others	197 (37.88%)	12 (26.67%)
Co-Morbidities		
Hypertension	27 (5.19%)	2 (4.44%)
Diabetes	28 (5.38%)	2 (4.44%)
Dyslipidemia	18 (3.46%)	2 (4.44%)
Bronchial Asthma	16 (3.08%)	1 (2.22%)
Hypothyroidism	16 (3.08%)	4 (8.89%)
Depression	1 (0.19%)	1 (2.22%)
Ischemic Heart Disease	1 (0.19%)	-

Table 1: The baseline characteristics of the study cohort.

Post-COVID Clinic: Basic Characteristics, Clinical Investigation, and Management

The male was the predominant gender, 24 (53.33%), their mean age was 36.76±11.15, and the Arabs were the majority, 33 (73.33%). Hypothyroidism was the most frequent co-morbidity (8.89%), followed by hypertension, diabetes, dyslipidemia (4.44%), and bronchial asthma and depression (2.22%). Most of the post-COVID clinic visitors underwent chest X-ray 27 (60%), laboratory investigations 27 (60%), electrocardiogram (ECG) testing 23 (51.11%), and Holter evaluation 2 (4.44%). Supplements and Symbicort inhalers were frequently prescribed to 17 (37.8%), and 14 (31.1%), respectively, and the olfactory training was advised by the physician for around 9% of patients. The need for analgesics and nasal spray was similar at 5 (11.11%), and anti-histamine was prescribed in 8 (17.78%) (Table 2).

	Total 45	**Within 30 days 27 (60.00%)**	**Beyond 30 days 18 (40.00%)**	***p***
General demographics				
Gender (female)	21 (46.67%)	15 (55.56%)	6 (33.33%)	0.143
Age	36.76 ± 11.15	35.85 ± 9.72	38.11 ± 13.20	0.512
Ethnicity (Arab)	33 (73.33%)	17 (62.96%)	16 (88.89%)	0.054
Co-morbidities				
Hypertension	2 (4.44%)	1 (3.70%)	1 (5.56%)	0.768
Diabetes	2 (4.44%)	1 (3.70%)	1 (5.56%)	0.768
Dyslipidemia	2 (4.44%)	2 (7.41%)	0 (0.00%)	0.238
Bronchial Asthma	1 (2.22%)	1 (3.70%)	0 (0.00%)	0.409
Hypothyroidism	4 (8.89%)	3 (11.11%)	1 (5.56%)	0.521
Depression	1 (2.22%)	1 (3.70%)	0 (0.00%)	0.409
Investigation				
Chest x-ray	27 (60.00%)	18 (66.67%)	9 (50.00%)	0.264
Labs	27 (60.00%)	17 (62.96%)	10 (55.56%)	0.619
ECG	23 (51.11%)	14 (51.85%)	9 (50.00%)	0.903
Holter	2 (4.44%))	1 (3.70%)	1 (5.56%)	0.768
Management				
Analgesics	5 (11.11%)	2 (7.41%)	3 (16.67%)	0.333
Anti-Histaminic	8 (17.78%)	4 (14.81%)	4 (22.22%)	0.524
Nasal spray	5 (11.11%)	2 (7.41%)	3 (16.67%)	0.333
Olfactory training	4 (8.89%)	2 (7.41%)	2 (11.11%)	0.669
Supplements	17 (37.78%)	12 (44.44%)	5 (27.78%)	0.259
Symbicort inhaler	14 (31.11%)	8 (29.63%)	6 (33.33%)	0.793
Antibiotics	1 (2.22%)	1 (3.70%)	0 (0.00%)	0.409
CBT	1 (2.22%)	1 (3.70%)	0 (0.00%)	0.409

CBT: Cognitive Behavioral Therapy

Table 2: General Characteristics of Early and Late post-COVID Clinic Patients.

Early vs. Late Post-COVID Clinic Presentation

We divided the occurrence of COVID-related symptoms based on the frequency for every 10% of the population into four groups. Most post-COVID clinic patients were complaining of generalized fatiguability (55.6%) followed by shortness of breath (26.67%) and cough (24.44%). The frequency of headache, sore throat, and change of smell sense was between 10% and 20%, and the rest of the symptoms were less than 10% (Table 3). Additionally, there were no statistically significant differences in symptoms between patients who presented to the post-COVID clinic early (within 30 days) or late (beyond 30 days) (Table 3). Over the follow-up period, we did not report any mortality cases within the studied population.

Clinical Symptoms	Within 30 days 27 (60.00%)	Beyond 30 days 18 (40.00%)	*p*
Symptoms frequency between 1 and 10%			
Body aches (4.44%)	1 (3.70%)	1 (5.56%)	0.768
Diarrhea (4.44%)	2 (7.41%)	0 (0.00%)	0.238
Nausea (2.22%)	1 (3.70%)	0 (0.00%)	0.409
Vertigo (4.44%)	1 (3.70%)	1 (5.56%)	0.768
Runny nose (4.44%)	0 (0.00%)	2 (11.11%)	0.076
Palpitation (4.44%)	1 (3.70%)	1 (5.56%)	0.768
Weakness (2.22%)	1 (3.70%)	0 (0.00%)	0.409
Dry red eye (2.22%)	1 (3.70%)	0 (0.00%)	0.409
Depression (2.22%)	1 (3.70%)	0 (0.00%)	0.409
Abdominal pain (4.44%)	2 (7.41%)	0 (0.00%)	0.238
Back pain (2.22%)	0 (0.00%)	1 (5.56%)	0.215
Chest pain (6.67%)	1 (3.70%)	2 (11.11%)	0.329
Symptoms frequency between 10% and 20%			
Headache (15.56%)	5 (18.52%)	2 (11.11%)	0.502
Sore throat (13.33%)	5 (18.52%)	1 (5.56%)	0.210
Loss/change of smell sense (15.56%)	3 (11.11%)	4 (22.22%)	0.314
Symptoms frequency between 20% and 30%			
Shortness of breath (26.67%)	6 (22.22%)	6 (33.33%)	0.409
Cough (24.44%)	7 (25.93%)	4 (22.22%)	0.777
Symptoms frequency of more than 30%			
Fatigue (55.56%)	17 (62.92%)	8 (44.44%)	0.221

Table 3: The patients' clinical presentations for the post-COVID clinic.

Discussion

The pandemic heavily affected the world with a highly contagious respiratory infection during the past years. Since the outbreak, studies reported the clinical features of COVID-19 patients [17,18]. However, the clinical characteristics of post-COVID-19 infection in different populations are lacking. Therefore, we reported the baseline characteristics, symptoms, and outcomes for post-COVID clinics patients with low co-morbidity profiles. Despite negative test findings, few patients had persistent symptoms, which needed further laboratory and radiological examinations.

The common clinical presentation for COVID patients was Fever and cough; the remaining symptoms, such as sore throat, fatigue, and headache, come in varies between patients [18]. However, the subsidy of symptoms or total remission is inconsistent in the current literature. A study of 55 COVID patients revealed that the proportions of patients had headaches (18.2%), fatigue (16.4%), and cough (1.8%) three months after discharge [19]. Another study reported that the most common symptoms in COVID patients two months after initial onset were flu-like symptoms (21.5%), chest pain (13.1%), arthralgia (16.3%), and digestive disorders (11.5%), which had

their follow up through phone calls and no clinic visit or physician assessment [20]. Huang et al. reported the six months of health consequences of COVID patients discharged from hospitals [21]. In their study, 63% of patients had fatigue or muscle weakness, and 26% had sleep difficulties [22]. However, the cough was not reported as a common symptom in post-COVID patients. Our study contradicts this finding since our patients had reported cough and shortness of breath in more than 20% of post-COVID clinic patients. In addition, previous studies have reported that smell, gustation, auditory, and vision changes often occur after infection with SARS-CoV2 [23]. Schneider and his colleagues reported that 22.7% of patients had abnormal smell symptoms two months after initial onset [24]. We had almost a similar finding within our patients who had a change in smell sensation in 15.6% during the follow-up period.

The duration of clinical symptoms post-COVID infection with a negative swab is lacking. Our data compared an early (within 30 days) versus late (beyond 30 days) post-COVID clinic presentation, which could show a difference since the viral reaction has immediate, short, and long-term manifestations [25]. Following that assumption, we had an equal age and gender distribution between the two presentation groups. However, Arab patients with low co-morbidity profiles were more likely to present beyond the 30 days post-COVID clinic. Risk profile, investigation needed, and management received show similar distribution with no significant statistical results. Patients' symptoms in the post-COVID clinic varied from more frequent symptoms of complaint to symptoms that did not appear. Nasal congestion and bleeding, difficult of swallowing, appetite disturbance, hair loss, and hearing difficulties were frequently reported in the previously available literature [26-28]. However, patients who presented to our post-COVID clinic never reported any previous symptoms. On the other hand, the reported symptoms also have no timing difference in presentation between the early and late groups.

Our study showed that 45 (8.65%) of COVID patients had abnormal symptoms after recovery after a median of 25 days following hospital discharge, like other viral pneumonia cases, including specifically SARS, MERS, and H7N9 pneumonia [29]. These results suggested that radiological abnormalities in the lung would take a longer time to resolve. Hui et al. reported that about a third of SARS patients had abnormal CT manifestations six months after discharge [30]. Another follow-up study of H7N9 reported that an abnormal chest CT scan was detected in 73.7% of H7N9 patients at a six-month follow-up and 67.7% at a one-year follow-up [31]. After the COVID-19 outbreak, numerous studies also demonstrated that many COVID-19 patients had abnormal chest CT findings after discharge [32]. Zhao, et al. reported that 70.91% of COVID-19 patients had radiological abnormalities three months after recovery [21]. A follow-up study of H7N9 patients found that 19.4% had lung fibrosis at one-year follow-up [31]. However, the long-term impact of SARS-CoV2 infection on lung function and pathology remains unclear. Long-term monitoring of lung function and radiological scans are needed for post-negative COVID test patients.

Strengths and Limitations

Our study has limitations. First, data were extracted retrospectively; although the patient follow-up in the post-COVID clinic was well organized and highly systematic, bias of retrospective studies might be introduced. Second, patients are highly selective for those who had access to our healthcare system from institution workers; therefore, the study's generalizability is limited to a population with the same baseline risk profile. It is not uncommon to have significant co-morbidities within the studied population, except for early phases of clinic trials, which need healthy volunteers. Our study included patients of low-risk profiles, which tend to be impeded within bigger populations. It strengthens the evidence for the treating physician to manage those patients effortlessly and provides ground evidence for future research.

Conclusion

Although few patients with COVID had symptoms one month after discharge, substantial patients still manifested abnormalities in laboratory and radiological examinations. These results suggested that convalescent COVID patients should be followed up in laboratory and radiological examinations long after discharge. Therefore, low-risk profile patients have similar persistent post-COVID symptoms during the first 30 days post-infection clearance or longer. This finding needs more dedicated parameter indicators and closed-duration monitoring.

Statements and Declarations

All authors have no conflicts of interest.

No funding was received for conducting this study.

References

1. World Health Organization (2023) WHO Coronavirus (COVID-19) Dashboard.
2. Du Toit A (2020) Outbreak of a novel coronavirus. Nat Rev Microbiol 18: 123.
3. Zhu N, Zhang D, Wang W, Li X, Yang B, et al. (2020) A Novel Coronavirus from Patients with Pneumonia in China, 2019. N Engl J Med 382: 727-733.
4. Huang C, Wang Y, Li X, Ren L, Zhao J, et al. (2020) Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. Lancet 395: 497-506.
5. Yang X, Yu Y, Xu J, Shu H, Xia J, et al. (2020) Clinical course and

outcomes of critically ill patients with SARS-CoV-2 pneumonia in Wuhan, China: a single-centered, retrospective, observational study. Lancet Respir Med 8: 475-481.

6. Wang D, Hu B, Hu C, Zhu F, Liu X, et al. (2020) Clinical Characteristics of 138 Hospitalized Patients With 2019 Novel Coronavirus-Infected Pneumonia in Wuhan, China. JAMA 323: 1061-1069.

7. Grasselli G, Zangrillo A, Zanella A, Antonelli M, Cabrini L, et al. (2020) Baseline Characteristics and Outcomes of 1591 Patients Infected With SARS-CoV-2 Admitted to ICUs of the Lombardy Region, Italy. JAMA 323: 1574-1581.

8. Huang R, Zhu L, Wang J, Xue L, Liu L, et al. (2020) Clinical Features of Patients With COVID-19 With Nonalcoholic Fatty Liver Disease. Hepatol Commun 4: 1758-1768.

9. Asadi-Pooya AA, Simani L (2020) Central nervous system manifestations of COVID-19: A systematic review. J Neurol Sci 413: 116832.

10. Bansal M (2020) Cardiovascular disease and COVID-19. Diabetes Metab Syndr 14: 247-250.

11. Terpos E, Ntanasis-Stathopoulos I, Elalamy I, Kastritis E, Sergentanis TN, et al. (2020) Hematological findings and complications of COVID-19. Am J Hematol 95: 834-847.

12. Wang J, Zhu L, Liu L, Zhao XA, Zhang Z, et al. (2020) Overweight and Obesity are Risk Factors of Severe Illness in Patients with COVID-19. Obesity (Silver Spring) 28: 2049-2055.

13. Huang R, Zhu L, Xue L, Liu L, Yan X, et al. (2020) Clinical findings of patients with coronavirus disease 2019 in Jiangsu province, China: A retrospective, multi-center study. PLoS Negl Trop Dis 14: e0008280.

14. Xu Y, Chen Y, Tang X (2020) Guidelines for the diagnosis and treatment of coronavirus disease 2019 (COVID-19) in China. Glob Health Med 2: 66-72.

15. Ranieri VM, Rubenfeld GD, Thompson BT, Ferguson ND, Caldwell E, et al. (2012) Acute respiratory distress syndrome: the Berlin Definition. JAMA 307: 2526-2533.

16. World Health Organization (2020) Criteria to release COVID-19 patients from isolation: Scientific brief.

17. Zhu N, Zhang D, Wang W, Li X, Yang B, et al. (2020) A novel coronavirus from patients with pneumonia in China, 2019. N Engl J Med 382: 727-733.

18. Guan WJ, Ni ZY, Hu Y, Liang WH, Ou CQ, et al. (2020) Clinical characteristics of coronavirus disease 2019 in China. N Engl J Med 382: 1708-1720.

19. Zhao YM, Shang YM, Song WB, Li QQ, Xie H, et al. (2020) Follow-up study of the pulmonary function and related physiological characteristics of COVID-19 survivors three months after recovery. EClinicalMedicine 25: 100463.

20. Carvalho-Schneider C, Laurent E, Lemaignen A, Beaufils E, Bourbao-Tournois C, et al. (2021) Follow-up of adults with noncritical COVID-19 two months after symptom onset. Clin Microbiol Infect 27: 258-263.

21. Huang C, Huang L, Wang Y, Li X, Ren L, et al. (2021) 6-month consequences of COVID-19 in patients discharged from hospital: a cohort study. Lancet 397: 220-232.

22. Gautier JF, Ravussin Y (2020) A new symptom of COVID□19: Loss of taste and smell. Obesity 28: 848.

23. Aschendorff A, Arndt S, Kröger S, Wesarg T, Ketterer M, et al. (2020) Quality of cochlear implant rehabilitation under COVID-19 conditions. HNO 69: 1-6.

24. Hajikhani B, Calcagno T, Nasiri MJ, Jamshidi P, Dadashi M, et al. (2020) Olfactory and gustatory dysfunction in COVID□19 patients: A meta□analysis study. Physiol Rep 8: e14578.

25. Haimed AMA, Saba T, Albasha A, Rehman A, Kolivand M (2021) Viral reverse engineering using Artificial Intelligence and big data COVID-19 infection with Long Short-term Memory (LSTM). Environ Technol Innov 22: 101531.

26. Seyfi S, Alijanpour R, Aryanian Z, Ezoji K, Mahmoudi M (2022) Prevalence of telogen effluvium hair loss in COVID-19 patients and its relationship with disease severity. J Med Life 15: 631-634.

27. Freedberg DE, Chang L (2022) Gastrointestinal symptoms in COVID-19: the long and the short of it. Curr Opin Gastroenterol 38: 555-561.

28. Stankevice D, Fjaeldstad AW, Agergaard J, Ovesen T (2023) Long□Term COVID□19 Smell and Taste Disorders Differ Significantly from Other Post□Infectious Cases. Laryngoscope 133: 169-174.

29. Ajlan AM, Ahyad RA, Jamjoom LG, Alharthy A, Madani TA (2014) Middle East respiratory syndrome coronavirus (MERS-CoV) infection: chest CT findings. AJR Am J Roentgenol 203: 782-787.

30. Hui D, Joynt G, Wong KT, Gomersall C, Li T, et al. (2005) Impact of severe acute respiratory syndrome (SARS) on pulmonary function, functional capacity and quality of life in a cohort of survivors. Thorax 60: 401-409.

31. Wang Q, Jiang H, Xie Y, Zhang T, Liu S, et al. (2020) Long-term clinical prognosis of human infections with avian influenza A (H7N9) viruses in China after hospitalization. EClinicalMedicine 20: 100282.

32. Xiong Y, Sun D, Liu Y, Fan Y, Zhao L, et al. (2020) Clinical and high-resolution CT features of the COVID-19 infection: comparison of the initial and follow-up changes. Invest Radiol 55: 332-339.